

WHAT IS CLAIMED IS:

1. A method for delivering a substance into skin comprising delivering the substance into an intradermal space within the skin through a small gauge needle inserted into the intradermal space, wherein an outlet of the needle is inserted at a depth within the skin such that leakage of the substance to the surface of the skin is substantially prevented.
2. The method of Claim 1 wherein the needle is selected from the group consisting of microneedles, catheter needles, and injection needles.
3. The method of Claim 1 wherein a single needle is inserted.
4. The method of Claim 1 wherein multiple needles are inserted.
5. The method of Claim 1 wherein the substance is a liquid delivered by pressure directly on the liquid.
6. The method of Claim 1 wherein a hormone is delivered.
7. The method of Claim 6 wherein the hormone is selected from the group consisting of insulin and PTH.
8. The method of Claim 1 wherein the substance is infused.
9. The method of Claim 1 wherein the substance is injected as a bolus.
10. The method of Claim 1 wherein the needle is about 300  $\mu\text{m}$  to 2 mm long.
11. The method of Claim 10 wherein the needle is about 500  $\mu\text{m}$  to 1 mm long.
12. The method of Claim 1 wherein the outlet is at a depth of about 250  $\mu\text{m}$  to 2 mm when the needle is inserted.
13. The method of Claim 12 wherein the outlet is at a depth of about 750  $\mu\text{m}$  to 1.5 mm when the needle is inserted.

14. The method of Claim 12 wherein the outlet has an exposed height of about 0 to 1 mm.
15. The method of Claim 14 wherein the outlet has an exposed height of about 0 to 300  $\mu\text{m}$
- 5 16. The method of Claim 1 wherein delivery rate or volume delivered is controlled by spacing of multiple needles, needle diameter or number of needles.
- 10 17. A needle for intradermal delivery of a substance into skin comprising means for limiting penetration of the needle into the skin and an outlet positioned such that when the needle is inserted into the skin to a depth determined by the penetration limiting means, leakage of the substance to the surface of the skin is substantially prevented.
- 15 18. The needle of Claim 17 wherein the outlet is at a depth of about 500  $\mu\text{m}$  to 2 mm when the needle is inserted into the skin.
- 20 19. The method of Claim 18 wherein the outlet is at a depth of about 750  $\mu\text{m}$  to 1.5 mm when the needle is inserted into the skin.
- 25 20. The needle of Claim 17 which is about 300  $\mu\text{m}$  to 2 mm long.
21. The needle of Claim 20 which is about 500  $\mu\text{m}$  to 1 mm long.
22. The needle of Claim 17 which is contained in a device comprising a reservoir in fluid communication with the needle.
23. The needle of Claim 22 which is contained in a device further comprising pressure-generating means for delivering the substance through the needle.
- 30 24. The needle of Claim 23 wherein the pressure-generating means provides variable control of substance delivery rate.

Add A1  
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